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(54) A corner joint for frames

(57) A rectangular door or window frame is assembled from reinforced plastics frame members 10, 11 each frame member comprising a main elongate element of hollow section e.g. of PVC with a metal reinforcing element 15 disposed within the hollow section. A corner cleat 17 has two slotted limbs 18, 19 extending at right angles to one another for reception in the hollow ends of two frame members respectively, and a screw 21 passing through the cleat and engaging a threaded portion 16 of the reinforcing element. Wedging elements 28, 29, 31 are forced into the slots in the cleat as the screw is tightened up, thus expanding the limbs of the cleat tightly into engagement with the internal walls of the hollow frame members.

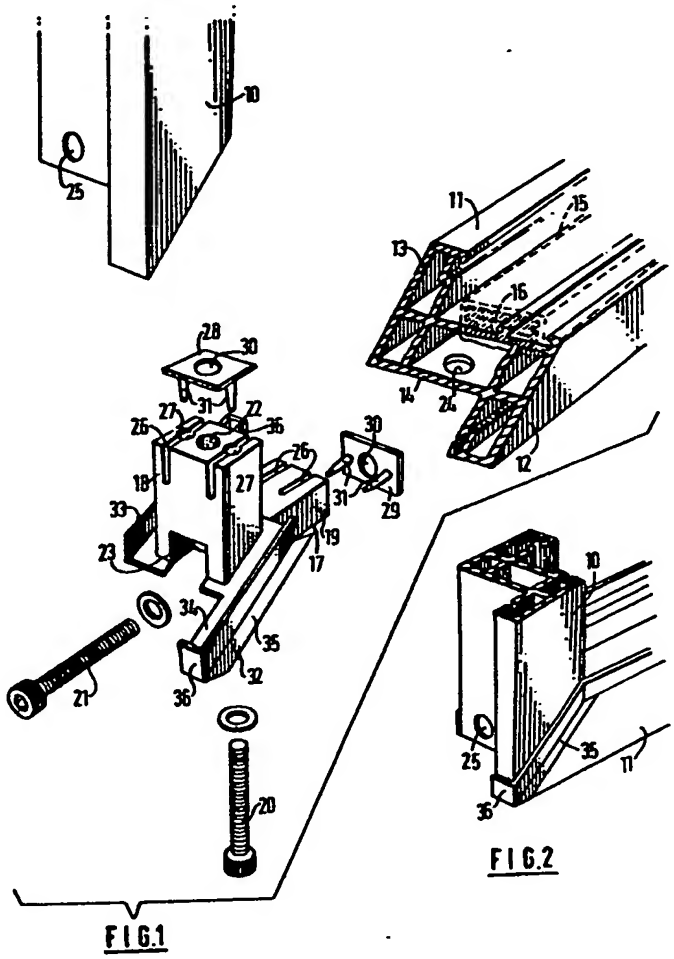

FIG.1

FIG.2

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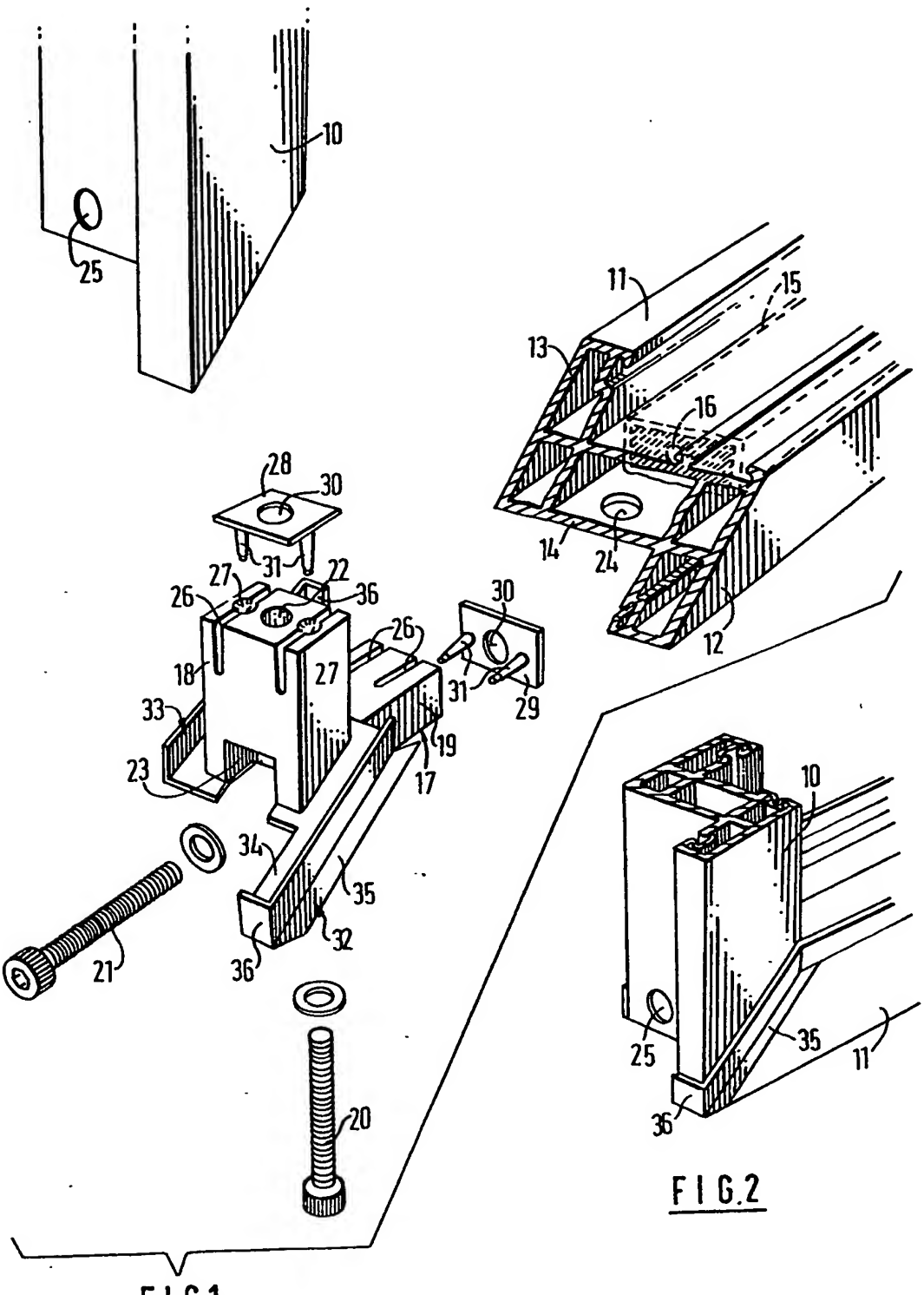
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FIG.1

FIG.2

SPECIFICATION

A corner joint for frames assembled from plastics frame members

The invention relates to corner joints for frames assembled from plastics frame members, where each frame member is of the kind comprising a main elongate element of hollow section formed from plastics material, such as PVC, and incorporating a metal reinforcing element disposed within the hollow section.

Conventionally frames, such as window and door frames, assembled from such plastics frame members have been constructed by welding the frame members together at the corners of the frame. Although such a method is in many ways ideal for the material, it is time-consuming and requires expensive welding equipment. The provision of the metal reinforcement in the frame members is necessitated by the inherent weakness of the plastics, and the metal reinforcement also dissipates heat to prevent thermal stresses caused by the good insulation properties of the plastics. However, in time the thermal stressing can cause failure of the weld.

In view of the above-mentioned disadvantages of welding plastics frame members, there is a requirement for effective mechanical jointing of such memebers. Mechanical corner jointing methods are commonly used with metal frame members but problems arise in devising mechanical jointing techniques for plastics members. In each case the frame members are normally formed by extrusion. Metal extrusions are normally accurately dimensioned both internally and externally, but the extrusion process for plastics, while it maintains reasonable accuracy on the external walls of the members, the internal walls of a hollow section tend to be irregular and inaccurately shaped and located. Furthermore securing the mechanical jointing components to the frame members can create local stress points where the plastics material will eventually degrade allowing the joints of the frame to open.

The present invention provides a corner joint for frames assembled from plastics frame members in which the above-mentioned problems may be overcome.

According to the invention there is provided a corner joint for frames assembled from plastics frame members of the kind first referred to, comprising a cleat body having two limbs extending substantially at right angles to one another for reception in the hollow ends of two frame members respectively, and means for mechanically securing the cleat body to the reinforcing element within each frame member.

The means for mechanically securing the cleat body to each reinforcing element may comprise a screw or bolt passing through the cleat body and engaging a threaded portion of the reinforcing element, or an anchor block secured thereto. In the case where an anchor block is provided it may be secured to the reinforcing element by any suitable means, such as screws, crimping or a spring-loaded device.

Preferably the limbs of the cleat body are so shaped and dimensioned as to fit within the hollow section of the frame member so as to engage internal walls of the hollow section. Each limb is preferably laterally expandable and operation of the means for securing the cleat body to the reinforcing element may be arranged to expand the limb so that it more tightly engages the internal surfaces of said internal walls of the hollow section. For example, the limb may be formed with slots into which wedging elements are forced as the cleat is secured to the reinforcing element, so as to expand the limb.

The cleat body may include a cover element so mounted on the cleat body as to overlie the junction between the two frame members when they are secured together by the cleat body. For example, the cover element may be of T-section, the leg of the "T" being disposed between the adjacent end edges of the frame members and the arms of the "T" overlying the front or rear faces of the frame members. Preferably two cover elements are provided on each cleat body to overlie the front and rear surfaces respectively of the frame members.

The following is a detailed description of an embodiment of the invention, reference being made to the accompanying drawings in which:

Figure 1 is an exploded perspective view of a corner joint according to the invention, and

Figure 2 is a perspective view of the assembled joint.

The drawings show two typical mitre-cut PVC frame members 10 and 11 at one corner of a window frame. As best seen from the end view of the frame member 11, each frame member comprises a front portion 12 providing the front surface of the window, and a rear portion 13, providing the rear surface of the window, the two portions being interconnected by a rectangular central hollow section 14.

Disposed within the central rectangular hollow section 14 is a metal reinforcing element 15 which is extruded from aluminium and is embodied within the plastics frame member by conventional techniques. The metal reinforcement provides a threaded aperture 16. This may either be provided directly on the aluminium reinforcing element by extruding the element with a longitudinal screw spline in conventional manner, or the aperture may be a threaded aperture formed in a separate anchor block secured to the metal reinforcing element 15 by screws, crimping or a spring-

loaded device.

The two frame members are connected together by means of a corner cleat 17, which may, for example, be moulded from nylon or other plastics material. The cleat 17 comprises two limbs 18 and 19 extending at right angles to one another, the limbs being so shaped and dimensioned in cross-section as to be received within the hollow sections 14 of the frame members 11 and 10 respectively.

The cleat 11 is secured to the frame members 10 and 11 respectively by screws 20 and 21 which pass through bores extending longitudinally of the limbs 18 and 19, only the bore 22 in the limb 18 being visible in Figure 1. The screws 20 and 21 are engageable with the apertures 16 in the reinforcing elements or anchor blocks in the frame members respectively, so that when the screws are tightened up the limbs 18 and 19 of the cleat are drawn tightly into the frame members and the cleat clamps the two frame members together at right angles with the mitred edges abutting one another. In the case where each reinforcing element itself is formed with a screw spline, the screws 20 and 21 are self-tapping screws.

Recesses 23 are formed in the cleat 17 to accommodate the heads of the screws 20 and 21, and holes 24 and 25 are provided in the frame members to provide access to the screw heads.

As best seen in Figure 1, the limbs 18 and 19 of the cleat are formed with parallel slots 26 which intersect bores 27 extending longitudinally of the limbs on either side of the bores, such as 22, which receive the fixing screws.

Co-operating with the ends of the limbs 18 and 19 are expansion members 28 and 29 respectively. Each expansion member comprises a rectangular plate formed with a central aperture 30 for the passage of the fixing screw, and tapered expansion plugs 31 projecting from one side of the plate and co-operating with the bores 27 in the limbs of the cleat.

The arrangement is such that each expansion member 28 or 29 is sandwiched between the end of its associated cleat limb and the corresponding reinforcing element 15 in the frame member, the expansion plugs 31 being received within the bores 27. As the screws are tightened up and the limbs of the cleat forced into the hollow section 14 of the frame member, the expansion plugs 31 are forced into the bores 27,opening the slots 26 and expanding the limbs laterally into firm engagement with the internal side walls of the hollow section 14 of each frame member. This assists in securing the cleat rigidly within each frame member regardless of any irregularities in the size and dimensions of the internal walls of the frame member.

Integrally moulded with the cleat 17, on opposite sides thereof, are two T-sectioned cover elements 32 and 33. The cover elements are so located that when the two frame members 10 and 11 are secured together by the cleat 17, as shown in Figure 2, the leg portion 34 of the T-section is sandwiched between the adjacent mitred edges of the frame members and the arm portion 35 of the T-section overlies the junction between the edges of the frame members to provide a neat finish to the corner of the frame. Cap portions 36 are integrally moulded on the outer end of the front cover element 32 and on the inner end of the rear cover element 33.

Jointing compound or sealant can be used along the mitred edges of the assembled frame members and beneath the cover elements 32 and 33 to seal against water penetration and to add strength to the joint. It will be appreciated that the cover elements 32 and 33 will, in any case, protect the joint and will be of more attractive appearance than the grooves or ridges normally created by conventional rapid welding techniques.

CLAIMS

1. A corner joint for a frame assembled from plastics frame members, wherein each frame member comprises a main elongate element of hollow section formed from plastics material, and incorporating a metal reinforcing element disposed within the hollow section, the corner joint comprising a cleat body having two limbs extending substantially at right angles to one another for reception in the hollow ends of two frame members respectively, and means for mechanically securing the cleat body to the reinforcing element within each frame member.

2. A corner joint according to claim 1, wherein the means for mechanically securing the cleat body to each reinforcing element comprise a screw or bolt passing through the cleat body and engaging a threaded portion of the reinforcing element, or an anchor block secured thereto.

3. A corner joint according to claim 2, wherein the screw or bolt engages an anchor block secured to the reinforcing element by screws, crimping or a spring-loaded device.

4. A corner joint according to any of claims 1 to 3, wherein the limbs of the cleat body are so shaped and dimensioned as to fit within the hollow section of the frame member so as to engage internal walls of the hollow section.

5. A corner joint according to claim 4, wherein each limb is laterally expandable and operation of the means for securing the cleat body to the reinforcing element is arranged to expand the limb so that it more tightly engages the internal surfaces of said internal walls of the hollow section.

6. A corner joint according to claim 5, wherein each limb is formed with slots into

which wedging elements are forced as the cleat is secured to the reinforcing element, so as to expand the limb.

7. A corner joint according to any of claims 1 to 6, wherein the cleat body includes a cover element so mounted on the cleat body as to overlie the junction between the two frame members when they are secured together by the cleat body.

8. A corner joint according to claim 7, wherein the cover element is of T-section, the leg of the "T" being disposed between the adjacent end edges of the frame members and the arms of the "T" overlying the front or rear faces of the frame members.

9. A corner joint according to claim 8, wherein two cover elements are provided on each cleat body to overlie the front and rear surfaces respectively of the frame members.

10. A corner joint for a frame, substantially as hereinbefore described with reference to the accompanying drawings.

11. A rectangular frame including four frame members, each frame member comprising a main elongate element of hollow section formed from plastics material, and incorporating a metal reinforcing element disposed within the hollow section, each pair of adjacent frame members being mechanically connected together by a corner joint according to any of the preceding claims.

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